

**WHAT IS CLAIMED IS:**

- 1           1.       A method for determining the wear to a storage battery by monitoring  
2       the state of charge of the storage battery, the method comprising:  
3                   identifying a plurality of deep discharge events when a state of charge  
4       value for the storage battery is less than a minimum state of charge value specified for  
5       the storage battery;  
6                   determining the duration of the plurality of deep discharge events; and  
7                   determining a wear variable which characterizes the wear as a function  
8       of the total number and the total duration of the plurality of deep discharge events;  
9                   wherein the wear variable increases as the total number and the total  
10      duration of the deep discharge events increases.
- 1           2.       The method of Claim 1 wherein the wear variable is determined  
2       according to a function such that the wear variable increases more than proportionally  
3       with the total number of deep discharge events.
- 1           3.       The method of Claim 1 wherein the wear variable is determined  
2       according to a function such that the wear variable increases more than proportionally  
3       with the total duration of the deep discharge events.
- 1           4.       The method of Claim 1 wherein only those deep discharge events  
2       whose duration exceeds a defined minimum duration are assessed in order to  
3       determine the total number.
- 1           5.       The method of Claim 4 wherein the defined minimum duration is  
2       defined as a function of at least one of the ambient temperature and the battery  
3       temperature.
- 1           6.       The method of Claim 4 wherein the defined minimum duration has a  
2       value of between approximately 0.1 and 100 hours at room temperature.

1           7.       The method of Claim 1 further comprising determining a loss of  
2 storage capacity for the storage battery in proportion to the wear variable on the basis  
3 of a storage capacity of the storage battery at a previous defined time.

1           8.       The method of Claim 7 wherein the storage capacity of the storage  
2 battery at the previous defined time is the storage capacity of the storage battery when  
3 the storage battery was new, and wherein the wear variable at the defined time is set  
4 to zero.

1           9.       The method of Claim 7 further comprising determining a first wear  
2 component that is dependent on the total number of identified deep discharge events.

1           10.      The method of Claim 9 wherein the first wear component has a value  
2 of between 0.1% and 50% of the storage capacity of the storage battery at the  
3 previous defined time after a first deep discharge event.

1           11.      The method of Claim 10 wherein the first wear component has a value  
2 of between 0.3% and 5% after the first deep discharge event at a battery temperature  
3 of approximately 20°C.

1           12.      The method of Claim 9 wherein the first wear component has a value  
2 of between 1% and 20% of the storage capacity of the storage battery at the previous  
3 defined time after a first deep discharge event.

1           13.      The method of Claim 12 wherein the first wear component has a value  
2 of between 0.3% and 5% after the first deep discharge event at a battery temperature  
3 of approximately 20°C.

1           14.      The method of Claim 9 further comprising determining a second wear  
2 component that is dependent on the total duration of the identified deep discharge  
3 events.

4           15.     The method of Claim 14 wherein the second wear component has a  
5     value of between 0.1% and 100% of the storage capacity of the storage battery at the  
6     previous defined time after a total duration of 100 hours.

1           16.     The method of Claim 15 wherein the second wear component has a  
2     value of between 0.3% and 5% after a total duration of 100 hours at battery  
3     temperatures in the region of 20°C.

1           17.     The method of Claim 14 wherein the second wear component has a  
2     value of between 0.1% and 20% of the storage capacity of the storage battery at the  
3     previous defined time after a total duration of 100 hours.

1           18.     The method of Claim 17 wherein the second wear component has a  
2     value of between 0.3% and 5% after a total duration of 100 hours at battery  
3     temperatures in the region of 20°C.

1           19.     The method of Claim 1 wherein the wear variable is determined from  
2     the sum of a first wear component that is dependent on the total number of deep  
3     discharge events and a second wear component that is dependent on the total duration  
4     of the deep discharge events.

1           20.     The method of Claim 19 wherein the first wear component is  
2     calculated from a first function that behaves linearly with regard to the total number  
3     of deep discharge events.

1           21.     The method of Claim 19 wherein the first wear component is  
2     calculated from a first function that behaves more than proportionally to the total  
3     number of deep discharge events.

1           22.     The method of Claim 19 wherein and the second wear component is  
2     calculated from a second function that behaves linearly with regard to the total  
3     duration of deep discharge events.

4           23.     The method of Claim 19 wherein and the second wear component is  
5     calculated from a second function that behaves more than proportionally to the total  
6     duration of deep discharge events.

1           24.     A monitoring device for storage batteries comprising:  
2                     a measurement unit for measuring variables which characterize the  
3     state of charge of the storage battery;  
4                     an evaluation unit for determining the state of charge of the storage  
5     battery from the measured variables and for determining the wear of the storage  
6     battery using a method comprising:  
7                     identifying a plurality of deep discharge events when a state of charge  
8     value for the storage battery is less than a minimum state of charge value specified for  
9     the storage battery;  
10                    determining the duration of the plurality of deep discharge events; and  
11                    determining a wear variable which characterizes the wear as a function  
12   of the total number and the total duration of the plurality of deep discharge events;  
13                    wherein the wear variable increases as the total number and the total  
14   duration of the deep discharge events increases.

1           25.     A computer program comprising:  
2                     program code means;  
3                     wherein the program code means are designed to carry out a method  
4   comprising:  
5                     identifying a plurality of deep discharge events when a state of charge  
6   value for the storage battery is less than a minimum state of charge value specified for  
7   the storage battery;  
8                     determining the duration of the plurality of deep discharge events; and  
9                     determining a wear variable which characterizes the wear as a function  
10   of the total number and the total duration of the plurality of deep discharge events;  
11                    wherein the wear variable increases as the total number and the total  
12   duration of the deep discharge events increases.